SOME INDIGENOUS VASCULAR PLANTS IN SITE NO 3, VICINITY WINSTONES QUARRY, HEBDEN CRESCENT, HUTT VALLEY, CENTRED ON NZMS 260 MAP R27 WELLINGTON, G.R.737032; LIST COMPILED ON 16-6-97 BY B.J. MITCALFE.

BOTANICAL NAME	MAAORI NAME	COMMON NAME
GYMNOSPERM TREES		
Dacrydium cupressinum	rimu	rimu
Prumnopitys ferruginea	miro	miro
MONOCOT TREES		
Cordyline australis	tii koouka	cabbage tree
Rhopalostylis sapida	niikau	nikau
DICOT TREES AND SHRUBS		
Aristotelia serrata	makomako	wineberry
Beilschmiedia tawa	tawa	tawa
Brachyglottis repanda	rangiora	rangiora
Carpodetus serratus	putaputaweetaa	marbleleaf
Coprosma areolata		
Coprosma grandifolia	kaanono	kanono
Coprosma rhamnoides		
Coprosma robusta	karamu	karamu
Coprosma robusta x Coprosma propinqua	karamu	karamu
Fuchsia excorticata	kootukutuku	tree fuchsia
Geniostoma rupestre var. ligustrifolium	hangehange	hangehange
Hebe stricta	koromiko	koromiko
Hedycarya arborea	porokaiwhiri	pigeonwood
Knightia excelsa	rewarewa	rewarewa
Laurelia novae-zelandiae	pukatea	pukatea
Leptospermum scoparium	maanuka	manuka
Macropiper excelsum	kawakawa	kawakawa
Melicytus ramiflorus	maahoe	mahoe
Lophomyrtus bullata	ramarama	ramarama
Myrsine australis	maapou	mapou
Olearia rani	heketara	heketara
Ozothamnus leptophyllus	tauhinu	tauhinu
Pseudopanax crassifolius	horoeka	lancewood
Schefflera digitata	patee	seven finger
Solanum laciniatum	poroporo	poroporo
MONOCOT LIANES		
Freycinetia baueriana ssp. banksii	kiekie	kiekie
Ripogonum scandens	kareao	supplejack
DICOT LIANES		

Metrosideros diffusa	aka tea	white climbing rata
Metrosideros fulgens	aka kura	scarlet rata
Parsonsia heterophylla	kaihua	parsonsia

FERNS

Asplenium bulbiferum	manamana	hen & chickens
Asplenium flaccidum	makawe o Raukatauri	hanging spleenwort
Asplenium oblongifolium	huruhuru whenua	shining spleenwort
Asplenium polyodon	petako	sickle spleenwort
Blechnum chambersii	nini	lance fern
Blechnum discolor	piupiu	crown fern
Blechnum filiforme	paanako	thread fern
Blechnum fluviatile	kiwakiwa	
Blechnum novae-zelandiae	kiokio	kiokio
Cyathea dealbata	ponga	silver fern
Cyathea medullaris	mamaku	mamaku
Cyathea smithii	kaatote	soft tree fern
Dicksonia squarrosa	whekii	wheki
Hymenophyllum demissum	mauku	filmy fern
Lastreopsis hispida		hairy fern
Histiopteris incisa	maataataa	water fern
Leptopteris hymenophylloides	heruheru	single crepe fern
Paesia scaberula	maataa	ring fern
Phymatosorus pustulatus	koowaowao	hound's tongue
Phymatosorus scandens	mokimoki	fragrant fern
Pneumatopteris pennigera	paakau	gully fern
Pteridium esculentum	raarahu	bracken
Pyrrosia eleagnifolia	ota	leather-leaf fern
Rumohra adiantiformis	karawhiu	
Trichomanes reniforme	raurenga	kidney fern

ORCHIDS

Thelymitra longifolia	maaikaika	sun orchid

SEDGES

Uncinia uncinata	matau a Maaui	hooked sedge

MONOCOT HERBS other than orchids or sedges.

Collospermum hastatum	kahakaha	collospermum

DICOT HERBS

Epilobium sp.		willowherb
Hydrocotyle elongata		hydrocotyle
Ranunculus reflexus	maaruuruu	hairy buttercup
Senecio minimus		fireweed
Stellaria decipiens	kohukohu	chickweed
Urtica incisa	ongaonga	scrub nettle

BIRDS SEEN/HEARD DURING THE RECONNAISSANCE:

INDIGENOUS BIRDS

Kereruu	NZ pigeon
Riroriro	Greywarbler
Piwaiwaka	Fantail
Tauhou	Waxeye

ADVENTIVE BIRDS

Magpie

SOME EXOTIC PLANTS

Berberis glaucocarpa	Barberry
Cytisus scoparius	Broom
Ilex sp.	Holly
Leycesteria formosa	Himalaya honeysuckle
Ulex europaeus	Gorse

PEST ANIMALS

Pigs?

Possum

NOTES ON A RAPID RECONNAISSANCE OF SITE 3, WINSTONES QUARRY, HEBDEN CRESCENT, HUTT VALLEY.

(SITE 15 e, BIOLOGICAL RESOURCES SURVEY, 1984).

FOR THE REASONS OUTLINED BELOW, THIS SITE IS CONSIDERED ECOLOGICALLY SIGNIFICANT IN TERMS OF THE RESOURCE MANAGEMENT ACT, 1991.

Note:

1. For the purpose of these notes, Site 3 refers to the area shown on the accompanying vegetation map, i.e. the area surveyed.

2. The vegetation was sampled in the general vicinity of the miro, (marked M), the rimu, (marked R), and the lower reaches of catchments A and B.

BOUNDARY
The existing boundary is considered adequate to protect the significant vegetation.

It should be revised to exclude:

the area on the eastern side of the internal road, (marked 5), which is in gorse and broom,

and the area on the southern side of the main stream, which is under a mosaic of gorse and early-stage indigenous successional species such as mahoe, (marked with vertical strokes).

FLORA AND FAUNA
The significant vegetation of Site 3 is indigenous, podocarp/broadleaved forest, with emergent tawa and rewarewa to 14+ metres, and an understorey of e.g. makomako, putaputaweetaa, porokaiwhiri, hinau, hangehange, kawakawa and ramarama. Pukatea to 12+ metres, nikau, tree ferns and lianes feature in the gullies. There is well-developed groundcover of at least 25 fern species.

Site 3 is significant habitat for birds. Species seen or heard were kereru, piwaiwaka, riroriro and tauhou. The most significant bird seen was kereru, NZ endemic, native pidgeon, *Hemiphaga novaeseelandiae*, ranked as medium-high priority in the Wellington Conservancy, and nationally vulnerable. One of our larger bird species, kereru are mainly frugivorous, tawa and miro fruit being one of their major food sources. They also rely on pigeonwood and nikau, both well-represented in Site 3. The forest of Site 3 is therefore highly significant to kereru, since so little podocarp/tawa forest remains in the vicinity.

With its well-developed, moist, leaf litter and dense aggregations of tree ferns, Site 3 has potential as indigenous landsnail habitat.

RARITY/REPRESENTATIVENESS
Site 3 is representative of Wellington's tawa-dominant, lowland,

hill-country forest from which mature podocarps have been logged.
Indigenous, lowland forest sites such as this are among those of most concern in the Wellington Conservancy, ("Plant Conservation Strategy", Wgtn Conservancy of DoC, 1996). This is because so many of these sites have been destroyed, reduced or degraded by development.

Podocarp regeneration is not a common occurrence in the Wellington Ecological District, and the presence of (pole) rimu, and miro to (est.) 10 metres height, is particularly significant.

DIVERSITY

The total of seventy indigenous, vascular plant species listed during the reconnaissance would no doubt be considerably augmented by an intensive botanical survey. There is significant diversity of habitat, ranging from gullies and streamsides to drier spur crests. A biological survey would be needed to establish the fauna present, other than the birds mentioned above.

DISTINCTIVENESS/LANDSCAPE INTEGRITY

This forested site stands out dramatically from its immediate, rural and industrial surroundings. The sombre, emergent crowns of tawa and rewarewa, and the dense flights of mamaku and ponga immediately claim attention as indigenous vegetation: it *belongs* there.

The dense vegetation helps soften the visual impact of the scars left by quarrying. Significant areas of naturally-occurring, indigenous vegetation such as this, are appropriate to the terrain.

CONTINUITY/LINKAGES

Fortunately, continuity with Belmont Regional Park which adjoins the northern boundary of Site 3, enables the upper reaches of the two catchments marked A and B, which have their lower reaches in Site 3, to be protected.

The vegetation of Site 3 will be an important component of eventual corridors of native vegetation joining the Korokoro catchment with the substantial, indigenous forest remnant to the northwest, (listed as as Site 15h in the Biological Resources Survey 1984), and with eastern areas of Belmont Regional Park such as Dry Creek.

CULTURAL/RECREATIONAL VALUES

Site 3 has significant scenic and landscape values, and recreation potential in the form of a scenic walkway sidling to eventually connect Kelson Bush and with Dry Creek.

The presence of kiekie is of significance to iwi.

POTENTIAL FOR ECOLOGICAL RESTORATION/SUSTAINABILITY

The presence of native pigeon is an indicator of the forest's sustainability potential. The tawa, miro and nikau regeneration

on the site is almost certainly due to bird activity. It could
be said that to a considerable extent, the sustainability of pidgeon, tawa and miro are interdependent.

If the site is protected from further fragmentation, predation by pest animals and damaging incursions it will continue its natural process of vegetation succession. It is notably weed-free except for a few patches of gorse, (which in the absence of fire will in fact accelerate succession), and some Himalayan honeysuckle (*Lycesteria formosa*) on the outskirts.

Control of pest animals and the maintainance of adequate buffering would accelerate the site's full recovery.

OTHER CONSERVATION BENEFITS

Site 3 has intrinsic value. "Landscapes do not need to be readily accessible or visible to have values which are worthy of protection. Some landscapes may not be accessible to people...but still have an intrinsic value which should be safeguarded. 'Intrinsic Value' is the value of the landscape in its own right, and the potential value that the landscape may hold for future generations." (Wellington (Draft) Regional Landscape Plan).

On the Inventory of Significant Wildlife Sites, the site is ranked as having potential, i.e. a positive ranking.

Site 3 has significant soil- and water-protection values. Compared with other local, land uses such as farming, the presence of this substantial area of vegetation helps mitigate the effects of erosion and siltation in the area.

THREATS

Further roading/quarrying incursion and the tipping of spoil are the main, direct threats. It is clear that the forested area has already been very recently reduced by road-widening. Site 3 is already small, and every incursion reduces the forest's viability even further. Road-widening is likely to have destroyed many roadside seedlings, for instance podocarps, which colonise such well-lit sites in order to become established. An example is the rimu marked "R" which has grown up through roadside bracken.
Road-widening has also opened up the bush to wind penetration and dehydration, i.e. "the edge effect". Species which cannot tolerate these conditions will die out, thus altering the composition of the forest.

Large quantities of spoil have been tipped to form a steep slope immediately east of the confluence at NZMS Map Sheet 260 R27 PtQ27 GR 739029, burying substantial vegetation. The quarry manager states however that Winstones do not propose to continue tipping on this slope. Instead, it is proposed to tip spoil on the north-facing slope covered with early-successional, indigenous vegetation, on the south side of the main stream, marked with vertical strokes on the map. This is not supported. It provides a valuable buffer for the significant forest on the north side of the stream, and if left undisturbed, will continue to revegetate with native species similar in composition to those

on the north side. In other words, it is the forest of tomorrow,
and is the subject of a recommendation below.

Some spoil could be used appropriately as a soil matrix for rehabilitative planting on the former quarry terraces south of the present quarry site, above SH2, and on the bare areas immediately northwest of Site 15 (pers. comm. Glenn Savage, Quarry Manager). This is strongly supported and is the subject of a recommendation below.

The lack of animal pest control is a threat to the sustainability of the Site 3 ecosystem. "Kereru are predated by rats, stoats and possums, and competition for fruit by possums may reduce breeding attempts." (Field Guide to the Birds of New Zealand, by Barrie Heather and Hugh Robertson, 1996). See recommendation below.

A potential threat is posed by a subdivision planned to occupy the land to the west of Site 3, which will destroy regenerating native vegetation at present acting as a buffer to the west of Site 3, and will further fragment the indigenous ecosystem. This makes it even more important that as much as possible of Site 3's vegetation be preserved.

RECOMMENDATIONS

1. That the catchment marked "A" on the map be retired from further tipping of spoil, as it has significance comparable to that of the main tawa-forested spur.

2. That as soon as it is consolidated, and under the guidance of a qualified ecologist, the slope marked with horizontal strokes (in catchment "A") be revegetated with locally-sourced indigenous species.

3. That if the slope on the south side of the main stream, (marked with vertical strokes on the vegetation map), is required for tipping spoil, it be given the same rehabilitative treatment as that recommended in the previous paragraph.

4. That in cooperation with the Wellington Regional Council, Site 3 be included in the regional animal pest control programme.

WINSTONES, SITE 3.

KEY TO VEGETATION MAP

Terrain and Features

- - - - - - -	ridge/spur
	road/farm track
.....	stream (including some culverted sections)
	completed spoil slope
	slope proposed by Winstones for tipping spoil
	boundary fence and gate
	pylon

Vegetation

	boundaries
R, M	pole rimu; emergent miro
1	tawa-rewarewa/(podocarp)/broadleaved forest
1a	tawa rewarewa forest;(pukatea) mahoe/nikau/mamaku/kiekie/ supplejack in gullies
2	broadleaved spp. e.g. putaputaweetaa /mamaku/nikau; gorse on spur crests
2a	mosaic of early-successional species, e.g. mahoe/rangiora/ gorse/broom on spur crests
A and B extending into Belmont	catchments with significant natural values Regional Park

3	(exotic conifers)/scrub/pasture
4	bare ground
5	gorse/broom

SOME INDIGENOUS VASCULAR PLANTS IN S.N.A. SITE NO 15, HAYWARDS QUARRY BUSH, VICINITY WINSTONES /FIRTH'S QUARRY, HEBDEN CRESCENT, LOWER HUTT, COMPILED ON 27-6-97 BY B.J. MITCALFE AND J. C. HORNE.

BOTANICAL NAME	MAORI NAME	COMMON NAME
MONOCOT TREES		
Rhopalostylis sapida	nikau	nikau
DICOT TREES AND SHRUBS		
Alectryon excelsus	titoki	titoki
Aristotelia serrata	makomako	wineberry
Beilschmiedia tawa	tawa	tawa
Brachyglottis repanda	rangiora	rangiora
Carpodetus serratus	putaputaweetaa	marbleleaf
Cassinia leptophylla	tauhinu	tauhinu
Coprosma areolata		
Coprosma grandifolia	kanono	kanono
Coprosma lucida	karamu	karamu
Coprosma robusta	karamu	karamu
Coprosma rhamnoides		
Corynocarpus laevigatus	karaka	karaka
Elaeocarpus dentatus	hinau	hinau
Geniostoma rupestre var. ligustrifolium	hangehange	hangehange
Griselinia littoralis	papauma	broadleaf
Hebe stricta	koromiko	koromiko
Hedycarya arborea	porokaiwhiri	pigeonwood
Knightia excelsa	rewarewa	rewarewa
Kunzea ericoides	kanuka	manuka
Leucopogon fasciculatus	mingimingi	mingimingi
Lophomyrtus bullata	ramarama	ramarama
Macropiper excelsum	kawakawa	kawakawa
Melicytus ramiflorus	mahoe	mahoe
Metrosideros robusta	raataa	rata
Myrsine australis	mapou	mapou
Olearia rani	heketara	heketara
Pittosporum tenuifolium	kohuhu	kohuhu
Pseudopanax crassifolius	horoeka	lancewood
Schefflera digitata	patee	seven finger
Solanum laciniatum	poroporo	poroporo
Weinmannia racemosa	kamahi	kamahi
MONOCOT LIANES		
Freycinetia banksii ssp. baueriana		
Ripogonum scandens	kareao	kareao

DICOT LIANES

Clematis paniculata	puawananga	
Metrosideros perforata	aka	rata vine
Metrosideros fulgens	aka kura	rata vine
Parsonsia heterophylla	kaiwhiria	
Rubus cissoides	tataraamoa	bush lawyer

LYCOPODS

Lycopodium volubile	waewaekoukou	club moss

WINSTONES SITE 15 CONT'D, PAGE 2.

FERNS

Asplenium bulbiferum	mouku	hen & chicken
Asplenium flaccidum	makawe a Raukatauri	hanging spleenwort
Asplenium hookerianum		
Asplenium oblongifolium	huruhuru whenua	shining spleenwort
Asplenium polyodon	petako	sickle fern
Blechnum chambersii	nini	
Blechnum discolor	piupiu	crown fern
Blechnum filiforme	paanako	thread fern
Blechnum sp. ("lowland")	kiokio	kiokio
Cyathea dealbata	ponga	silver fern
Cyathea medullaris	mamaku	mamaku
Dicksonia squarrosa	wheki	wheki
Hymenophyllum demissum	mauku	filmy fern
Hypolepis ambigua		
Hypolepis rufobarbata		
Lastreopsis hispida		
Histiopteris incisa	maata	water fern
Paesia scaberula	matata	ring fern
Pellaea rotundifolia	tarawera	
Phymatosorus pustulatus	kowaowao	hound's tongue
Phymatosorus scandens	mokimoki	climbing hound's tongue
Pneumatopteris pennigera	paakau	gully fern
Polystichum richardii	pikopiko	shield fern
Pteridium esculentum	raarahu	bracken
Pyrrosia eleagnifolia	ota	leatherleaf fern
Rumohra adiantiformis	karawhiu	

ORCHIDS

Thelymitra longifolia	maikuku	sun orchid

GRASSES

Cortaderia toetoe	toetoe	toetoe

SEDGES

Uncinia uncinata	matau a Maui	hook grass

DICOT HERBS

Haloragus erecta
Nertera depressa
Senecio minimus

ADDITIONAL INFORMATION:

POTENTIAL PROBLEM PLANTS

Buddleja davidii	Buddleia
Leycesteria formosa	Himalayan honeysuckle
Cytisus scoparius	Broom
Ulex europaeus	Gorse

NOTES ON A RAPID RECONNAISSANCE OF (PART) SITE 15, HAYWARDS QUARRY BUSH, HEBDEN CRESCENT, S.H.2.

FOR THE REASONS OUTLINED BELOW, THIS SITE IS CONSIDERED ECOLOGICALLY SIGNIFICANT IN TERMS OF THE RESOURCE MANAGEMENT ACT 1991, SECTION 6.

BOUNDARY

The strip of forest on the northwestern edge of Site 15, part of the area indicated by the DoC as having significant natural values, has recently been completely covered over with quarry spoil. It has therefore been eliminated from this survey and should be deleted from the S.N.A. area. It is the subject of a recommendation below.

The existing S.N.A. boundary appears to include, and should include, the very steep escarpment in the southwest section, (centred on NZMS 260 Map R27 PtQ27, GR 744025), covered in second-growth native vegetation, forming a natural, green backdrop to the lower operating level of the quarry site. It is this escarpment, marked 3, with cross-hatching, on the vegetation map, which is the subject of these notes, a near-vertical portion of Site 15. **For clarity, from here on it will be referred to as 15a.**

Because of the need to observe safety procedures advised by quarry staff, it was not possible to ascertain exactly the line of the fence separating Site 15 from 15a, nor to conduct a personal reconnaissance. Instead, the site was surveyed through binoculars. A large part of Site 15 was botanised in error before we realised it was Firth's property, not Winstones. The plant species list for Site 15 is considered only broadly indicative of 15A's species, but is included here, since 15 and 15A are contiguous and ecologically continuous.

The S.N.A. boundary should be revised to exclude the spoil-slope area marked ////// coded 5, and to include the areas marked 1, 3 and 4.

FLORA AND FAUNA

The significant vegetation of 15 includes (est.) 12 metre rewarewa/tawa, with a sub-canopy of titoki-karaka and an understorey of e.g. kawakawa, ramarama, mahoe, horoeka and hangehange. A post-mature hinau to 700 mm d.b.h. with layers of epiphytes was seen, indicating the considerable age of some components of the ecosystem. Nikau and supplejack are plentiful and there is a developing groundcover of fern species. Whereas fuchsia and five-finger, species habitually browsed by possum were not seen, the vegetation is in reasonably good condition except near the quarry face, where it is damaged and fragmented by quarrying activity. It is notable that the escarpment is virtually weed-free.

Tawa, karaka, titoki, pidgeonwood and nikau, all present on the site, are favoured food of kereru, native pigeon. Site 15 must therefore be of significance as bird habitat and food source, making Site 15 and 15a complementary to Site 3.

RARITY/REPRESENTATIVENESS

Lowland forest sites are among those of most concern in the Wellington Conservancy, ("Plant Conservation Strategy", Wgtn Conservancy of DoC, 1996). This is because so many of them have been destroyed or severely modified by development. Site 15 is representative of Wellington west's tawa-dominant, lowland- hill-country forest from which mature podocarps have been logged.

A DoC inventory lists northern rata and black beech for Site 15. The presence of these species is very significant, since northern rata (*Metrosideros robusta)* is now a very uncommon component of Wellington ecosystems, and the southern limit of black beech (*Nothofagus solandri var. solandri)* in Wellington was previously thought to be further north, at Dry Creek.

Aside from the vegetation, a significant feature of the site which contributes to its rarity value, is its situation, i.e. adjacent to and immediately north of the Wellington Faultline, a regionally- and nationally-outstanding landscape feature, part of our natural heritage.

HISTORY/CULTURAL FACTORS

The NZMS 1 Series Map N160 HUTT, 1965, shows native forest extending from the vicinity of Site 15a, almost continuously for a mile to the northwest. Most of this has now been lost.

Crossing the spur crest is an overgrown 4WD track running roughly parallel to S.H.2, which, if permission from Winstones could be obtained, could eventually become part of a scenic walkway linking the site with e.g. Dry Creek.

The presence of kiekie is of significant to iwi.

DIVERSITY

Sixty-nine indigenous species were listed in the reconnaissance, including 32 trees/shrubs. Further botanical survey would no doubt add to this list.

The steep, south-facing slope, a moist gully and a rounded spur crest, each landform with its own characteristic vegetation, offer considerable habitat diversity despite the small area.

DISTINCTIVENESS/LANDSCAPE INTEGRITY

This steep, vegetated landform above the extractive, industrial site floor, stands out in complete contrast to its surroundings. Rising to over 100 metres altitude, it has natural prominence in the landscape.

Site 15a's indigenous vegetation adorns this portion of the Wellington Faultline appropriately. With sympathetic management, it will eventually contribute significantly to healing the surrounding landscape to the extent that is possible in an industrial area.

CONTINUITY/LINKAGES

The proximity of S.N.A. Site 3, Kelson Bush, Liverton Rd Bush and Belmont Regional Park, makes Sites 15 and 15a part of a series

of indigenous vegetation sites, a seed source and a refuge for bird life. Nearby gullies at right angles to and above SH2, already contain advanced second-growth vegetation such as nikau, rewarewa and puka.

RESTORATION/SUSTAINABILITY
Without further fragmentation by incursion of roading or quarrying, if buffered by the proposed planting of locally-sourced, indigenous species e.g. on the groomed area to the northeast, (marked 5), and complemented by the vegetation of the rest of Site 15, 15a may be just large enough to be self-sustaining. Given time and protection, rimu, rata, black beech and pukatea (which have been recorded in the DoC inventory for Site 15) could become established on Site 15a. They may already be present in seedling or sapling form.

Tawa, titoki, pigeonwood, karaka and nikau seedlings are evidence of bird activity, of tui and pigeon in particular, which augur well for the site's potential to continue its succession towards mature forest. This process will be greatly assisted by animal pest control. See recommendation below.

OTHER CONSERVATION VALUES
The dense vegetation is providing significant protection for this steep face, from erosion and slipping. It also acts as a buffer to the rest of Site 15 and is a prominent natural feature viewed by all those entering the quarry from the south.

THREATS
The immediate threat is further quarrying, roading and/or tipping of spoil in the vicinity. Spread of fire from nearby gorse as a result of vandalism is an indirect threat. Predation of birds, particularly kereru, is a threat to the survival of the forest and its biota.

RECOMMENDATIONS
1. That under the supervision of an ecologist, the area marked 5, be planted with locally-sourced indigenous plants.

2. That in cooperation with Wellington Regional Council, Sites 15 and 15a be subject to animal pest control.

ACKNOWLEGEMENT
Full cooperation from Winstones quarry manager during the reconnaissance was appreciated.

WINSTONES/FIRTH: SITE NO. 15.

KEY TO VEGETATION MAP

Terrain and Features

- - - - - - -	ridge/spur
	road/track
	vegetated escarpment
///////////////	spoil slope
	stream/water/diversion channel
	quarry terraces/former quarry terraces

Vegetation

	boundaries
1	tawa-rewarewa/hinau/titoki forest with mamaku/nikau/supplejack/kiekie in gullies
2	gorse/broom/indigenous scrub
2a	mosaic of early-successional species overtopping gorse
3	closed-canopy, indigenous, mid-successional species, e.g. mahoe, rangiora, mamaku
4	second-growth tawa/hinau/broadleaved forest
5	bare area groomed for rehabilitative planting